Before the
Federal Communications Commission
Washington, D.C.

In the matter of:

Revitalization of the AM Radio Service	)	**MB Docket No. 13-249**
Second Further Notice of Proposed	)	**FCC 15-142**
Rule Making	)	

COMMENTS OF CARL T. JONES CORPORATION

Introduction

Carl T. Jones Corporation ("CTJC"), an engineering consulting firm, hereby submits comments in response to the Commission's October 5, 2018 Second Further Notice of Proposed Rule Making ("SFNPRM") in the above-captioned Proceeding. CTJC provides technical assistance to AM broadcasters, supporting development of new and improved transmission facilities. CTJC and its predecessors have been engaged in these endeavors continuously since 1935.

The SFNPRM sets forth a new proposal for daytime interference protection to Class A stations and revised alternative proposals for nighttime and critical hours interference protection to Class A stations. The SFNPRM proposes no revisions to the proposed Rule changes set forth in the previous Further Notice of Proposed Rulemaking (FNPRM) for Class B, C and D stations.[1] However, additional comments are requested regarding the Rules proposed in the FNPRM.

CTJC previously filed Comments and Reply Comments in the initial Notice of Proposed Rulemaking (NPRM) and the FNPRM in this Proceeding. Because our Comments and Reply Comments in response to the FNPRM are pertinent to the current proposals in the SFNPRM, those Comments and Reply Comments have been attached.

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[1] The FNPRM was released on October 23, 2015.

We are appreciative of the Commission's efforts to revitalize the AM Broadcast Service and believe that the proposals set forth in the SFNPRM are on target in that regard with the exceptions noted herein. Our comments focus on the new proposals for daytime, nighttime and critical hours interference protection afforded to Class A stations. We also comment on the proposed change to the protected daytime service contour of Class B, C and D stations. We fully support the proposed Rule changes regarding daytime adjacent channel interference protection and nighttime interference protection for Class B, C and D stations for the reasons stated in our previously filed Comments and Reply Comments.

Proposed Alternative Changes To Nighttime Interference Protection Criteria for Class A Stations

In the SFNPRM, the Commission invites comment on two proposed alternative nighttime interference protection criteria for Class A stations. Both of these proposals would eliminate the current protection afforded to the 0.5 mV/m-50 percent skywave contour in favor of protecting a Class A station's groundwave contour. Proposed Alternative 1 would allow no overlap of a Class A station's 0.5 mV/m groundwave contour and a co-channel interfering station's 0.025 mV/m-10 percent skywave contour (calculated using the single station method). Alternative 2 would not allow co-channel interference to be increased above the greater of the 0.5 mV/m groundwave contour or the 50 percent RSS exclusion limit ("the night limit") of the affected Class A station (calculated using the multiple station method). In both alternatives the proposed protected to interfering signal ratio is 20 to 1 (26 dB).

As described in our previous Comments attached, CTJC evaluated the night limits of all Class A stations located in the contiguous United States. The study found that the night limits of these stations ranged from 0.5 mV/m to 3.1 mV/m and that the median value of the Class A station night limits was 1.7 mV/m.[2] It was concluded that during nighttime hours, the service area of a Class A station in the contiguous United States is limited, at a minimum, to the area within its 0.5

[2] A typographical error in our Comments filed in response to the FNPRM erroneously stated the median night limit as 1.1mV/m instead of 1.7 mV/m .

mV/m groundwave contour by existing skywave interference and therefore, it would be appropriate that Class A stations be afforded protection to the 0.5 mV/m groundwave contour and not the 0.5 mV/m-50 percent skywave contour as is required under the current Rules.

In order to evaluate the two alternatives proposed in the SFNPRM, additional studies were performed by this firm. The results of these studies indicate that both alternatives afford approximately the same protection to a Class A station when the night limit of the Class A station is between 0.9 mV/m and 1.0 mV/m. It was determined in the study that a Class A station having a night limit of greater than approximately 0.95 mV/m would be afforded greater protection from a co-channel interferer under Alternative 1 while a Class A station having a night limit of less than approximately 0.95 mV/m would be afforded greater interference protection under Alternative 2. This finding is somewhat intuitive in that under Alternative 2 (RSS method), a Class A station with a night limit of 1 mV/m would be afforded protection to 50% of the night limit corresponding to 0.5 mV/m. This is the same groundwave signal level that is protected in Alternative 1 and therefore it might be assumed that the two alternatives would provide equivalent protection for a night limit of 1 mV/m. However, the protection in Alternative 1 is to the Class A station's 0.5 mV/m groundwave contour while the night limit calculation of Alternative 2 is referenced to the Class A station's site. The difference in the distance between the Class A station's protected contour and its site results in a slightly lower night limit where the two alternatives provide equivalent protection.

It was also determined in the study that approximately 15% of the Class A stations have a night limit of less than 0.95 mV/m and approximately 85% of the Class A stations have a night limit that is greater than 0.95 mV/m. ***In light of the above, the proposed Alternative 1 interference protection criteria would provide greater interference protection to approximately 5.6 times as many Class A stations as proposed Alternative 2.***

A second study performed by this firm evaluated the potential nighttime improvement that might be possible for Class B and D stations under the Alternative 1 interference protection criteria. The purpose of this study was to determine whether or not substantial nighttime improvement would be possible for co-channel Class B and D stations under the proposed Alternative 1 criteria. Six Class A channels were selected for study. The channels were selected to provide a wide frequency range and to evaluate interference protection to Class A stations located in various regions of the country. The Class A stations operating on the six selected channels are: KFI, 640 kHz, Los Angeles CA; WJR, 760 kHz, Detroit, MI; KYW, 1060 kHz, Philadelphia, PA; KEX, 1190 kHz, Portland, OR; WLAC, 1510 kHz, Nashville, TN; and KNZR, 1560 kHz, Bakersfield, CA. The night limits of these six Class A stations ranged from 0.88 mV/m to 3.05 mV/m.

To limit the study to a manageable size, it was assumed that: 1) there would be no change to the nighttime pattern of each Class B and D station after adoption of the new Alternative 1 interference protection rules; and 2) only the protection to the co-channel Class A station would be considered when determining the potential nighttime power increase for each station. The second assumption is likely to overestimate the nighttime power that might be achievable because each Class B or D station's power is likely to be further constrained by interference protection requirements toward other co-channel Class B stations. However, the main purpose of our study was to quantify the relief that is provided in the interference protection constraint from the co-channel Class A station under the assumption that proposed Alternative 1 Rule changes are adopted.

There are a total of 51 Class B stations authorized to operate on the six Class A channels studied.[3] It was determined that all but one of the 51 Class B stations would be able to increase nighttime power toward the co-channel Class A station's protected contour under the Alternative 1 interference protection criteria. ***Further, it was found that for the six Class A channels studied, a Class B station, on average, would be able to increase its night power by a factor of greater than 20 toward the co-channel Class A station's protected contour. The median power increase factor for the 51 stations studied was 9.8.***

[3] Only those Class B stations that currently operate with a power of less than 50 kW were selected for the study.

With regard to the Class D stations operating on the six Class A channels studied, all 111 stations would be able to operate with some night service, although in the worst cases the power level would be just a few watts. However, approximately 53% of the Class D stations would be able to increase their night power toward the protected contour of the Class A station to 250 watts or greater and in many cases significantly greater. Depending on interference protection constraints to other Class B stations, many of these Class D stations could have the ability to upgrade to Class B status such that their new night service would be protected from interference.

It is clear from the technical studies described above that the selection of the proposed Alternative 1 nighttime interference protection criteria for Class A stations would allow substantial improvement in nighttime service for the majority of co-channel Class B and D stations while at the same time minimizing the interference to the affected Class A station's nighttime service area. Although the Alternative 2 criteria would result in even greater nighttime improvement potential for co-channel Class B and D stations, it would be at the cost of increased interference to the majority of the Class A stations' nighttime service areas. Further, because of interference protection constraints imposed by other co-channel Class B stations, the potential for further nighttime improvement for Class B and D stations, potentially offered by the proposed Alternative 2 rules, may never be realized. ***For all of the reasons stated above, we encourage the Commission to adopt the proposed Alternative 1 nighttime interference protection criteria for Class A stations.***

Proposed Changes to Class A Station Daytime and Critical Hours Interference Protections

In the SFNPRM, the Commission proposes changing a Class A station's daytime protected contour from the 0.1 mV/m contour to the 0.5 mV/m contour when considering co-channel interference. With regard to critical hours interference protection to Class A stations, two alternatives are proposed: Alternative 1 affords no protection to Class A stations during critical hours; and Alternative 2 affords protection to a Class A station's 0.5 mV/m daytime groundwave contour during critical hours.

Proposed Change to Daytime Protected Contour

In the SFNPRM the Commission cites several commenters who state that a Class A station's 0.1 mV/m groundwave signal cannot be heard due to the increase in manmade noise in the AM frequency band today. We agree with these commenters with respect to most locations in the United States. However, we believe that the proposed increase in the protected contour from the 0.1 mV/m to the 0.5 mV/m is too great of a change. As will be shown below, such a large change in the protected contour would result in significantly greater relief than would be necessary to facilitate substantial power increases for other co-channel Class B and D stations.

Unlike the nighttime service of a Class A station, where the station's service is limited by skywave signals from distant co-channel stations, the daytime service of most Class A stations is limited by noise. It is well known that the noise power in the AM frequency band has increased since the current Rules were adopted and, as a result, a 0.1 mV/m signal level is likely to be unlistenable in most areas of the country. However raising a Class A station's protected contour from the 0.1 mV/m to the 0.5 mV/m as proposed, corresponds to a 14 dB increase and implies that the noise power in the AM frequency band has increased by a factor of 25. We believe that on a nationwide basis this assumed noise power increase is overstated.

Selecting a higher than necessary daytime protected contour may result in substantial interference to the Class A station's service area particularly in areas of the country where the noise power is substantially below that found in the major metropolitan areas. Because Class A stations are intended to provide wide area coverage and many listeners rely on these stations for critical emergency information, we propose limiting the increase to a Class A station's protected contour to 6 dB in order to maintain service in low noise environments. Therefore, we recommend a 0.2 mV/m daytime groundwave protected contour for Class A stations rather than the proposed 0.5 mV/m contour.

To support our recommended alternative daytime protected contour, comparative studies were performed to ascertain the expected improvement that might be possible in the daytime powers of co-channel Class B and D stations under the assumption of a 0.2 mV/m protected contour and the proposed 0.5 mV/m protected contour for Class A stations. As demonstrated below, substantial increases in daytime power would be possible if the Commission were to adopt a 0.2 mV/m protected contour, even under a worst case scenario. It is also shown that if the proposed 0.5 mV/m protected contour were adopted, existing Cass B and D stations operating under the same worst case scenario would be able to increase power to greater than 250 kW without causing interference to the pertinent Class A station on the channel. This strongly suggests that it is unnecessary to increase a Class A station's daytime protected contour to the proposed 0.5 mV/m level in order to provide substantial daytime relief to other co-channel Class B and D stations operating on the Class A channel.

The study performed by this office assumed a hypothetical Class B or D station operating non-directionally with an initial daytime power of 1 kW and a radiator height of 90 electrical degrees. To evaluate the worst case scenario, it was assumed that the Class B or D station's 0.005 mV/m interfering contour was tangent to the Class A station's 0.1 mV/m protected contour. An evaluation was performed to determine the daytime power increase that would be possible for the hypothetical Class B or D station for Class A daytime protected contours of 0.2 mV/m and 0.5 mV/m. For these studies, the protected to interfering contour ratio was assumed to be 20:1.

The studies were performed for five Class A stations that were selected to provide a wide range of operating frequencies and to allow evaluation of varied soil conductivities in different areas of the country. The maps of Figures 1 through 5 show the various protected and interfering contour scenarios for each of the Class A stations studied. In order to limit the study to a manageable size, it was assumed that: 1) there was no change to the daytime pattern of the hypothetical Class B or D station after adoption of the new daytime protected contour; and 2) only the interference protection to the co-channel Class A station was considered when determining the potential daytime power increase. The second assumption is likely to overestimate the daytime power that may be possible for many stations because the maximum power of each Class B or D station is likely to be further constrained by daytime interference protection requirements toward other co-channel Class B and D stations as well as adjacent channel stations. However, the main purpose of the study was to quantify the relief that is provided in the interference protection constraint toward the co-channel Class A station under the assumption that a different daytime groundwave protected contour is adopted.

Under the assumption that the Class A station's protected contour was increased to 0.2 mV/m (0.01 mV/m interfering contour), it was found that the hypothetical 1 kW Class B or D station's power could be increased by an average factor of 13.6. The power increase for the five channels studied ranged from 13.0 to 15.0.[4]

Under the assumption that the Class A station's protected contour was increased to 0.5 mV/m (0.025 mV/m interfering contour) as currently proposed, it was determined that the hypothetical 1 kW Class B or D station's power could be increased to 50 kW for all five Class A channels studied. The power level that would be required to achieve tangency of the 0.5 mV/m protected contour and the 0.025 mV/m interfering contour ranged from 253 kW to 497 kW. Of course the maximum allowable power for Class B and D stations is 50 kW. It is apparent that even a 1 kW station operating under a worst case scenario would be expected to achieve the maximum 50 kW power level toward the affected Class A station at a protected contour far less than the proposed 0.5 mV/m contour.

These studies clearly demonstrate that even in a worst case scenario, an average daytime power increase of over 13 to 1 is possible under the assumption that the Class A station's protected contour is increased 6 dB from 0.1 mV/m to 0.2 mV/m. Further, increasing the Class A station's protected contour to the proposed 0.5 mV/m contour is expected to result in substantially greater relief for other co-channel Class B and D stations than would be necessary for these stations to increase power to 50 kW toward the Class A stations protected contour.

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[4] A similar study was performed under the assumption that a hypothetical Class B or D station is operating with an initial power of 5 kW. In this study, for all five Class A channels studied, the power of the hypothetical Class B or D station could be increased to 50 kW assuming a Class A station daytime protected contour of 0.2 mV/m.

Based on these findings, we encourage the Commission to consider changing a Class A station's daytime protected contour from 0.1 mV/m to 0.2 mV/m rather than to the proposed 0.5 mV/m. We believe that this alternative proposal would result in a fair balance between minimizing interference to a Class A station's service area particularly in low noise environments and providing other co-channel Class B and D stations the ability to materially increase their daytime powers to better serve their communities.

Proposed Change to Critical Hours Protection Criteria

The SFNPRM proposes two alternatives for critical hours interference protection to a Class A station's daytime service area. The first alternative proposal would eliminate critical hours protection all together while the second alternative proposal would afford critical hours protection to a Class A station's 0.5 mV/m daytime groundwave contour. In our Comments and Reply Comments in response to the FNPRM, we supported maintaining critical hours protection to a Class A station's protected 0.1 mV/m daytime groundwave contour. In our Reply Comments we showed the interference that would be predicted to occur from a single interfering station within the 0.1 mV/m daytime contour of Class A station KMOX should critical hours protection be eliminated.

We continue to support maintaining critical hours protection however, in line with our comments on the daytime protected contour for a Class A station above, we support protection to the 0.2 mV/m groundwave contour.

As pointed out in the previous section, a change to the daytime protected contour of a Class A station from 0.1 mV/m to 0.5 mV/m corresponds to a 14 dB change which is substantial. A station that affords critical hours protection to a Class A station under today's Rules would be allowed, under the Alternative 2 proposed rules, to increase its radiated field toward the protected Class A station by a factor of up to 5 times corresponding to a power increase of up to 25 times.

A review of all stations that reduce power during critical hours (approximately 184 stations) revealed that in no case is a station's critical hours power more than 14 dB below the station's authorized daytime power. Therefore, if all of these stations are allowed up to a 14 dB power increase during critical hours as proposed under Alternative 2, not a single station would be required to reduce power during the critical hours periods. In effect, both proposed critical hours interference protection Alternatives result in no critical hours interference protection to Class A stations at least as it pertains to existing co-channel Class B and D stations.

In the previous section of our comments, we recommended changing the daytime protected contour of a Class A station from the 0.1 mV/m contour to the 0.2 mV/m contour rather than the proposed 0.5 mV/m contour. Assuming that this recommendation is adopted, we further recommend that critical hours protection be afforded to a Class A station's 0.2 mV/m daytime groundwave contour to ensure that service within the 0.2 mV/m contour is protected from interference during all hours of the day.

Adopting a critical hours protection criteria based on a 0.2 mV/m protected daytime contour would result in substantial benefit to the other stations that currently protect a Class A station's 0.1 mV/m protected contour during critical hours. Assuming protection is afforded to the daytime 0.2 mV/m groundwave contour, of the approximately 184 stations that currently afford critical hours protection to Class A stations, two-thirds of them would no longer have to reduce power during critical hours and the remaining one-third would be able to increase their critical hours power by a factor of four toward the protected Class A station.

In summary, we support maintaining critical hours interference protection to Class A stations. For the reasons given in this and the previous section of our comments, we recommend that the 0.2 mV/m contour and not the proposed 0.5 mV/m contour be adopted as the daytime protected groundwave contour for Class A stations. Therefore, we recommend that the Commission maintain critical hours protection for Class A stations but protect these stations to the 0.2 mV/m groundwave contour rather than the 0.5 mV/m groundwave contour as proposed in Alternative 2.

Proposed Rule Changes for Class B, C and D Stations

In the SFNPRM the Commission proposes no revisions to the proposed Rule changes in the FNRPM with respect to Class B, C and D stations. For the reasons stated in our previously filed Comments and Reply Comments, CTJC supports all of the proposed daytime and nighttime Rule changes with respect to Class B, C and D stations with the exception of the proposal to change the daytime protected contour of these stations from the 0.5 mV/m contour to the 2.0 mV/m contour. We agree that the noise environment in most areas has increased over the past many decades since the Rules specifying the current daytime protected contour were adopted. However, the proposal to change the daytime protected contour from 0.5 mV/m to 2.0 mV/m implies a noise power increase of 16 times (12 dB). In line with our comments regarding the proposed change to the daytime protected contour of Class A stations, it is our opinion that this magnitude of change in noise power is overstated and may only be present in the largest metropolitan areas. Any new Rules that are adopted in this Proceeding however must carefully consider stations in all regions of the country including regions where the noise power is substantially less than that found in major metropolitan areas.

The penalty for selecting a protected contour that is higher than necessary to overcome manmade noise is that stations with listenable service between the 0.5 to 2.0 mV/m contours may lose a portion of their service area to co-channel and adjacent channel interference. It might be possible for a station to partially or fully mitigate the loss of service through a power increase under the proposed Rules however, for a substantial number of stations a power increase will not be possible. Examples of the categories of stations that would not be able to increase power include: most Class C stations, Class B and D stations already operating at maximum power (50 kW), stations that are limited to their present power level by domestic or international interference protection constraints, and stations that do not have the financial means to purchase the equipment and/or modify their antenna systems as required to implement a power increase.

We recommended in our previous Comments that the protected contour should be increased from the present 0.5 mV/m contour to the 1.0 mV/m. We continue to believe that this 6 dB increase in the daytime protected contour strikes a good balance between the needs of stations operating in urban environments where noise powers can be quite high and those stations operating in smaller cities and towns or stations serving rural areas where the noise environment can be quite low.

In reviewing the Reply Comments filed in response to the FNPRM, it was noted that the engineering consulting firm of duTreil Lundin and Rackley, Inc. ("dLR") had proposed another alternative aimed at reducing interference when compared to the Rules proposed in the FNPRM and now proposed in the SFNPRM. In the dLR alternative proposal, the daytime protected contour would be increased from the 0.5 mV/m contour to the 2.0 mV/m, as currently proposed in the SFNPRM, however, the co-channel interfering contour would be reduced from the currently proposed 0.1 mV/m contour to the 0.05 mV/m contour. This in effect would reduce potential co-channel interference by 6 dB when compared to the SFNPRM proposal. Although not proposed in the dLR Reply Comments, it would follow that the adjacent channel interfering contour should also be reduced from the 2 mV/m contour to the 1 mV/m contour to achieve the same 6 dB reduction in adjacent channel interference when compared to the SFNPRM proposal.

Although the dLR alternative proposal would not provide the same degree of interference reduction as the CTJC proposal (1 mV/m daytime protected contour), it would result in a substantial reduction in interference when compared to the SFNPRM proposal and therefore, it is considered a viable second alternative to the currently proposed rule changes. ***We continue to believe that the selection of a daytime protected contour of 1 mV/m rather than 2 mV/m is the best approach to balance the needs of stations operating in urban environments with those operating in smaller cities and towns or serving rural areas. However, should the Commission decide to increase the daytime protected contour of Class B, C and D stations to 2 mV/m, we encourage the Commission to reduce the co-channel interfering contour from the proposed 0.1 mV/m contour to the 0.05 mV/m contour, as proposed by dLR, and that the first adjacent***

channel interfering contour be reduced from the proposed 2.0 mV/m contour to the 1.0 mV/m contour.[5]

Respectfully Submitted, February 7, 2019

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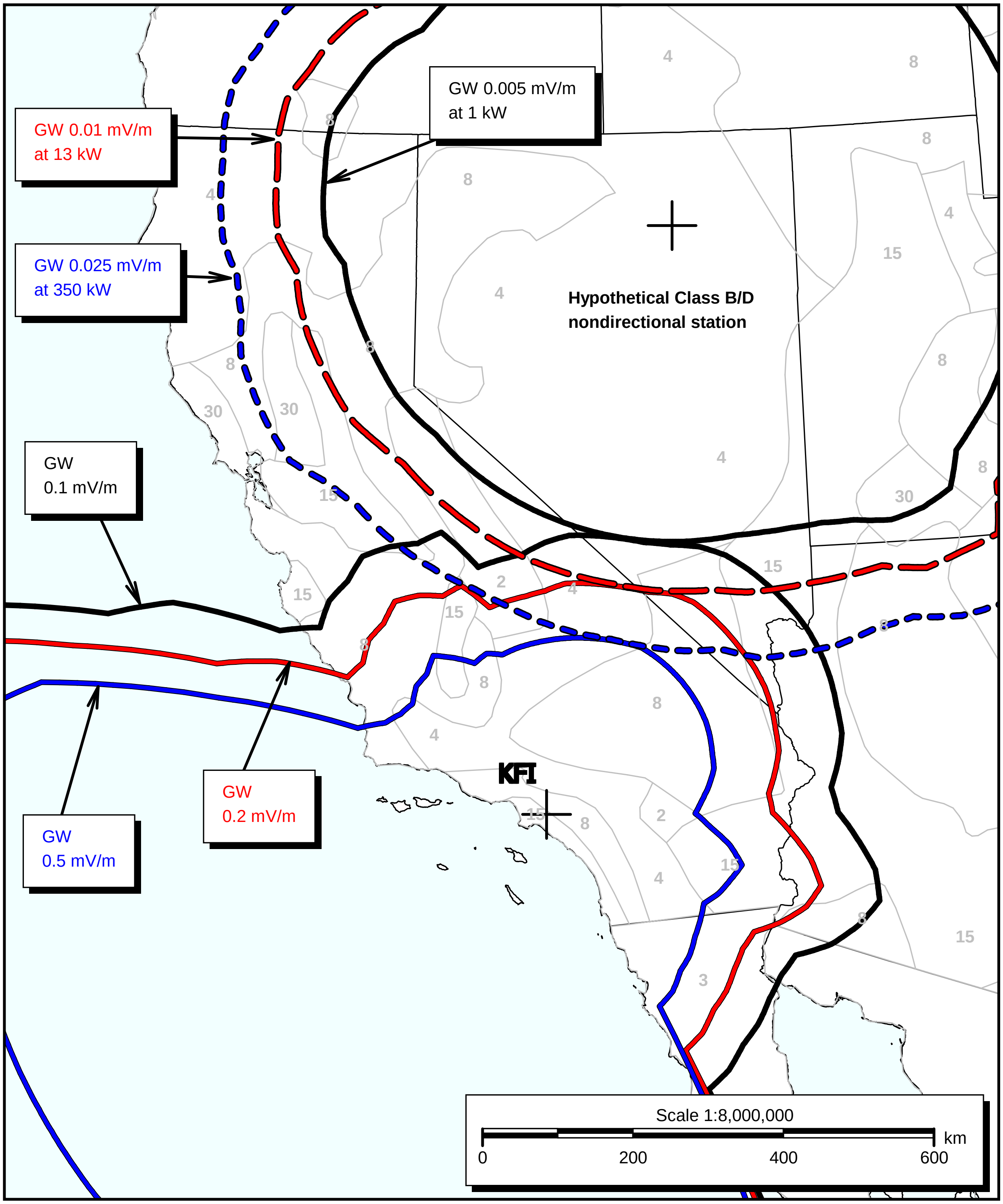
[5] Note that the ratio of the first adjacent channel protected to interfering contours under this alternative proposal is 2 to1 (6dB) which is the same contour ratio as that in the current Rules.

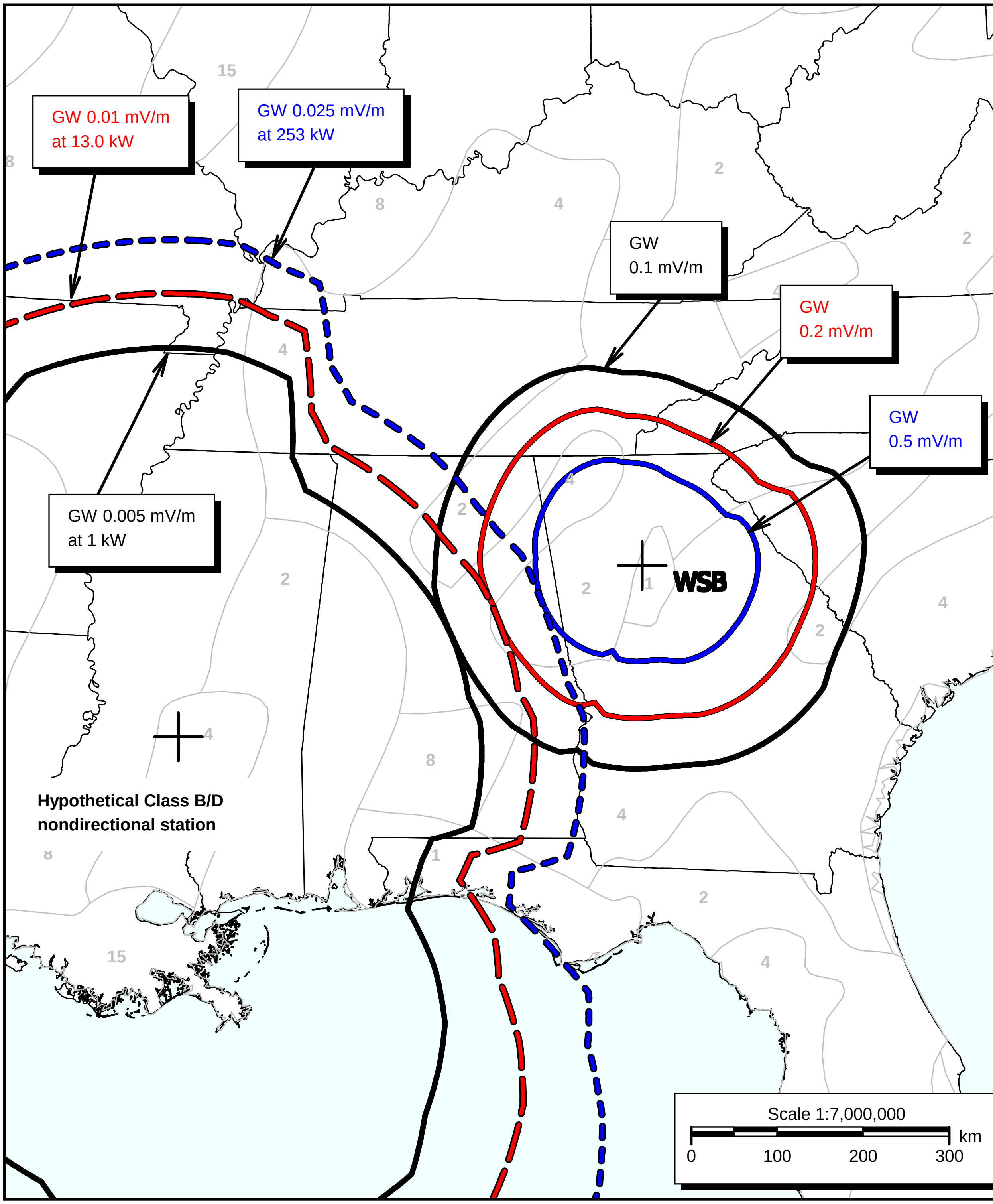
FIGURE 1



EVALUATION OF POTENTIAL POWER LEVELS
FOR DIFFERENT CLASS A PROTECTED CONTOURS
KFI - 640 KHZ - LOS ANGELES, CALIFORNIA
FEBRUARY, 2019

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

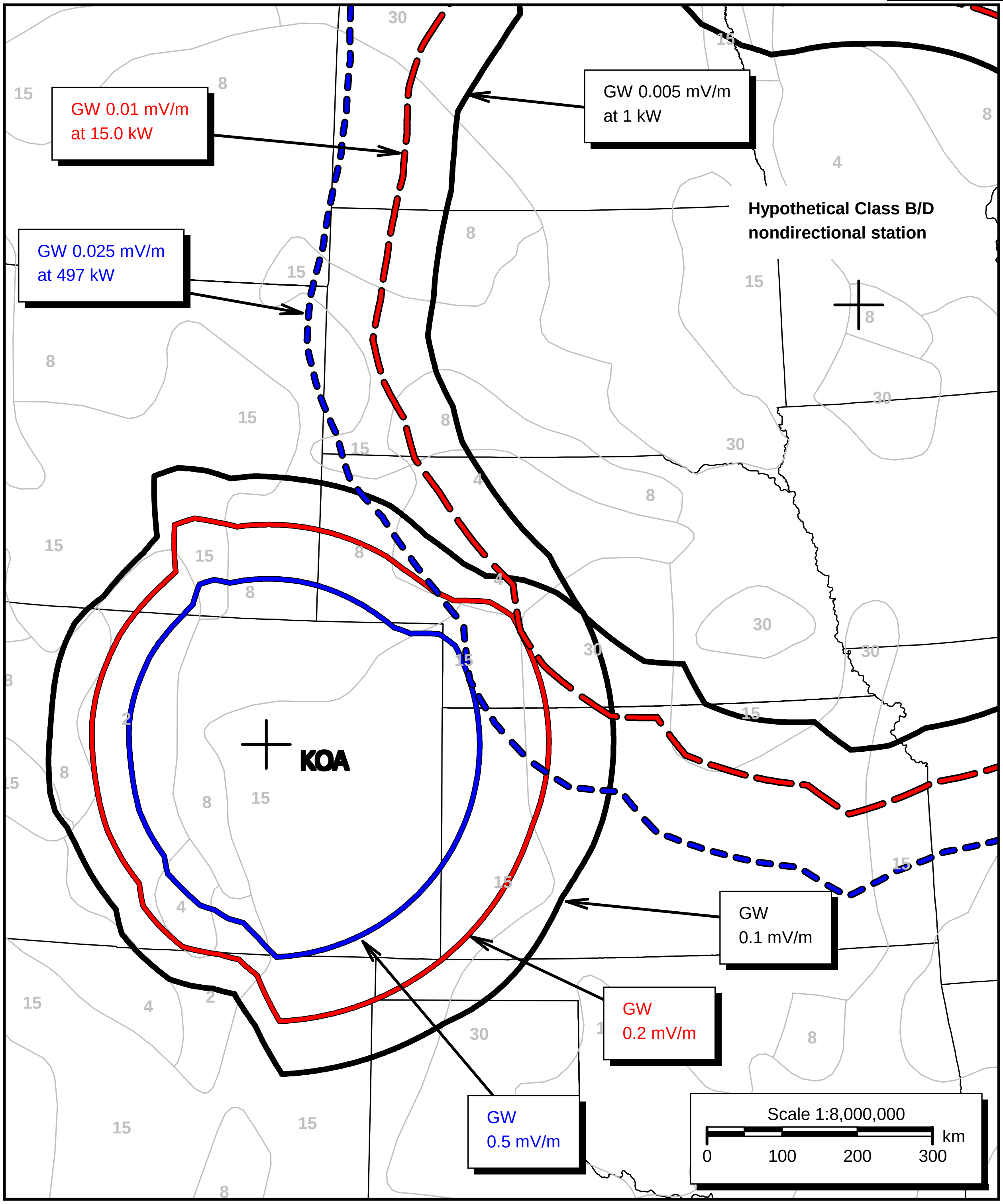
FIGURE 2



EVALUATION OF POTENTIAL POWER LEVELS
FOR DIFFERENT CLASS A PROTECTED CONTOURS
WSB - 750 KHZ - ATLANTA, GEORIGA
FEBRUARY, 2019

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

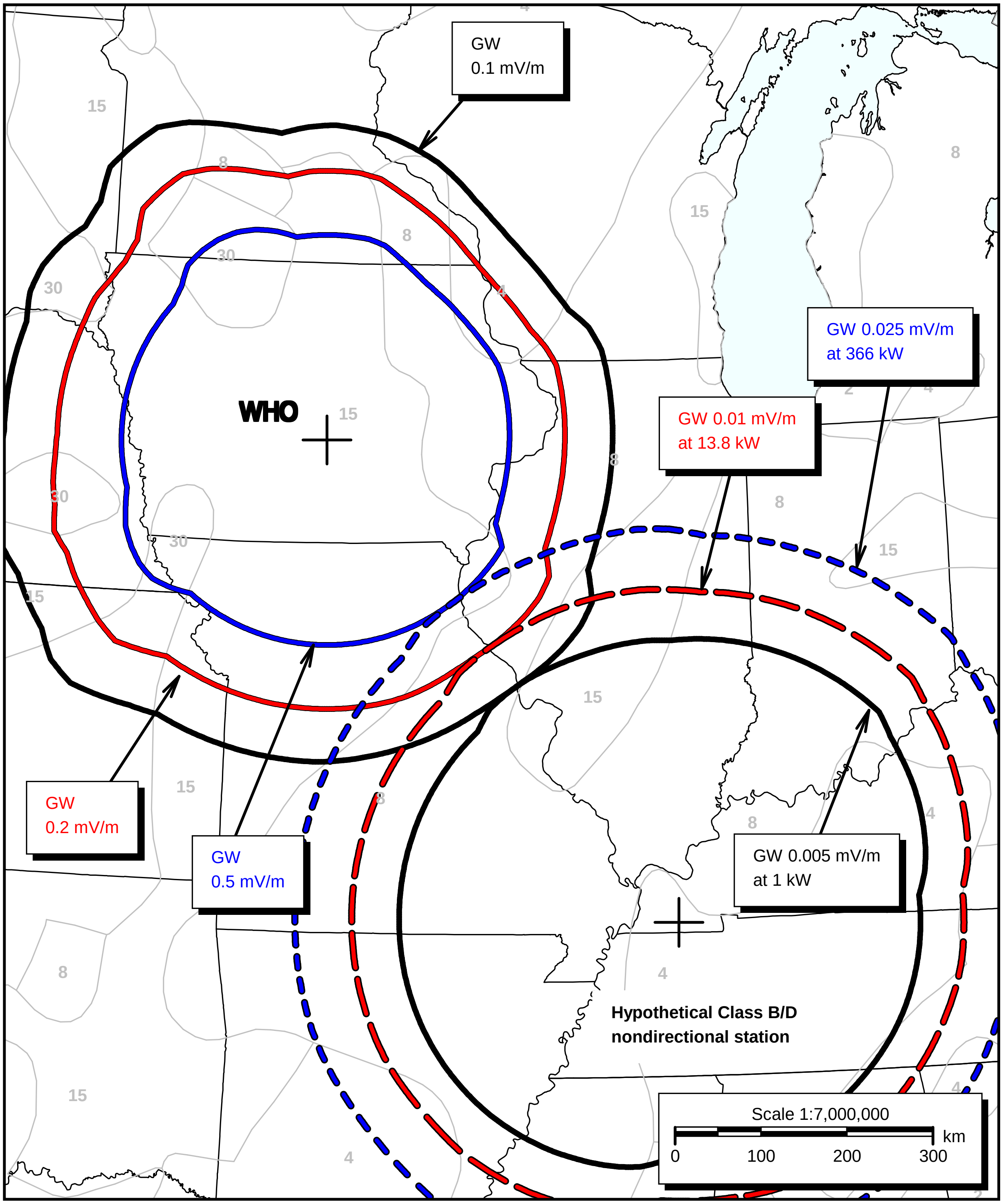
FIGURE 3



EVALUATION OF POTENTIAL POWER LEVELS
FOR DIFFERENT CLASS A PROTECTED CONTOURS
KOA - 850 KHZ - DENVER, COLORADO
FEBRUARY, 2019

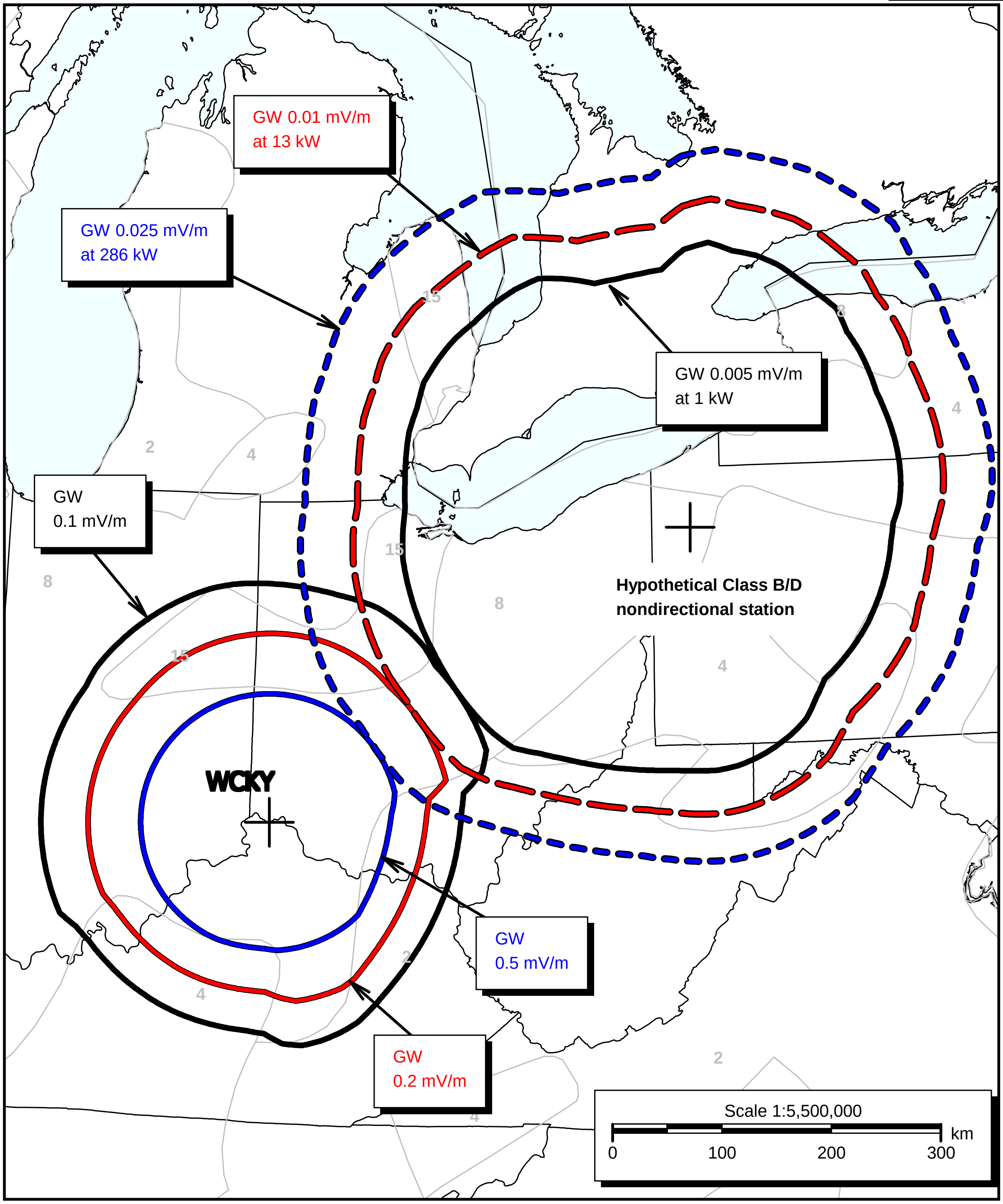
Consulting Engineers
CTJC
CARL T. JONES CORPORATION

FIGURE 4



EVALUATION OF POTENTIAL POWER LEVELS
FOR DIFFERENT CLASS A PROTECTED CONTOURS
WHO - 1040 KHZ - DES MOINES, IOWA
FEBRUARY, 2019

FIGURE 5



EVALUATION OF POTENTIAL POWER LEVELS
FOR DIFFERENT CLASS A PROTECTED CONTOURS
WCKY - 1530 KHZ - CINCINNATI, OHIO
FEBRUARY, 2019

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

ATTACHMENTS

Comments and Reply Comments filed by CTJC in FNPRM

Before the
Federal Communications Commission
Washington, D.C.

In the matter of:

	)	
Revitalization of the AM Radio Service	)	**MB Docket No. 13-249**
Further Notice of Proposed Rule Making	)	**FCC 15-142**

COMMENTS OF CARL T. JONES CORPORATION

Carl T. Jones Corporation, an engineering consulting firm, hereby submits comments responding to the Commission's October 23, 2015 Further Notice of Proposed Rule Making ("FNPRM") in the above-captioned proceeding. Carl T. Jones Corporation ("CTJC") provides technical assistance to AM broadcasters, supporting development of new and improved transmission facilities. CTJC has been engaged in these endeavors continuously since 1935.

This FNPRM is the second part of a major revision to the technical standards intended to revitalize the use of the AM broadcast band to better serve the needs of the listening public. The first part of this revitalization effort has been achieved by several Rule changes adopted in this proceeding's First Report and Order. We have reviewed the Commission's FNPRM and offer the following comments.

Change Nighttime and Critical Hours Protection to Class A AM Stations

In the FNPRM, the Commission proposes changing the protected nighttime contour for Class A stations from the 0.5 mV/m - 50% skywave contour to the 0.1 mV/m groundwave contour. It also proposes changing the nighttime co-channel interfering contour from the 0.025 mV/m - 10% skywave contour to the 0.005 mV/m groundwave contour. Since the Rule changes proposed in Appendix B of the FNPRM continue to afford skywave protection to Class B stations during nighttime hours, we believe that the proposal to protect Class A stations with a groundwave contour, as indicated by 73.182(q) [redesignated as (o)] of Appendix B, may be in error. However, if the Commission is indeed considering the nighttime groundwave interfering contour as the only nighttime interference protection criterion for Class A stations, CTJC performed studies to demonstrate the adverse effect this would have on four Class A stations

Since the facilities of potential interfering stations on the Class A channels can range from 0.25 kW to 50 kW, for this study we chose hypothetical co-channel stations using non-directional quarter wave antennas, and powers ranging from 0.25 kW and 50 kW. To satisfy the proposed nighttime protection requirements each hypothetical station was, in turn, placed at a distance such that its 0.005 mV/m groundwave contour was just tangent to the 0.1 mV/m groundwave contour of the relevant co-channel Class A station. To determine resultant nighttime interference from each hypothetical interfering station, a single site-to-site skywave night limit was calculated for the affected Class A station. The results are tabulated below.

	Hypothetical 0.25 kW Station		**Hypothetical 50 kW Station**	
Class A Station	**Required Distance Separation (km/miles)**	**Nighttime Interference Limited Field Strength (mV/m)**	**Required Distance Separation (km/miles)**	**Nighttime Interference Limited Field Strength (mV/m)**
WSM, 650 kHz Nashville, TN	890.1 / 553.1	1.54	1375.5 / 854.7	10.61
WLS, 890 kHz Chicago, IL	769.9 / 478.4	1.70	1035.2 / 643.2	14.66
KDKA, 1020 kHz Pittsburgh, PA	614.2 / 381.6	2.41	866.3 / 538.3	20.07
WHAM, 1180 kHz Rochester, NY	549.5 / 341.4	2.62	690.1 / 428.8	26.44

Table 1. Predicted Nighttime Skywave Interference from Hypothetical Interfering Stations that Comply with the Proposed Groundwave to Groundwave Nighttime Interference Protection Criterion

These results demonstrate that groundwave only nighttime interference protection to Class A stations would cause a devastating and unacceptable reduction of the Class A station's nighttime interference-free coverage area. Therefore, based on previous experience, these and other studies, CTJC would support proposed Rule changes affecting Class A station protection **only** if the Rules will ultimately provide all Class A stations with 10% skywave interference protection to their groundwave protected contour during nighttime hours.

To better understand the Class A station interference situation during nighttime hours, CTJC performed RSS night limit studies on all of the Class A stations located in the 48 contiguous states. In all cases, the RSS night limits of the Class A stations were found to be greater than 0.5 mV/m. The night limits ranged from just over 0.5 mV/m to 3.1 mV/m with a median value of 1.1 mV/m. Based on the results of the RSS night limit studies, CTJC supports a 0.5 mV/m protected groundwave contour for Class A stations instead of the proposed 0.1 mV/m contour based on the present level of predicted nighttime interference from domestic and foreign co-channel stations. We further propose that the Class A protection criterion specify that there can be no overlap of the Class A station's nighttime 0.5 mV/m protected groundwave contour from a potential interfering station's 0.025 mV/m - 10% skywave contour. It is believed that this protection criterion will limit new nighttime interference to the Class A station's present service area while at the same time providing some relief to other stations operating on the Class A channel that desire a new nighttime service, in the case of Class D stations or an improvement to their existing nighttime service in the case of Class B stations.

Critical Hours protection is presently afforded to the daytime Primary groundwave service area of the Class A stations during the "transitional period" of the daytime hours of operation. The technical provisions adopted in the late 1950's limits a Class B facility's radiated field in the direction of the co-channel Class A station's primary service area based on the frequency, distance and azimuth to the 0.1 mV/m contour of the Class A station. This "daytime skywave" prediction uses a substantially reduced ionospheric reflection coefficient for the period 2 hours after sunrise and 2 hours prior to sunset when compared to the normal nighttime, second hour after sunset prediction. While the FNPRM does not propose to alter the protected daytime service contour, it does propose to eliminate the Critical Hours protection entirely. CTJC opposes this proposed change.

Change Nighttime RSS Calculation Methodology

CTJC supports the proposal to roll back the 1991 rule changes as it pertains to calculation of nighttime RSS values of interfering field strengths and nighttime interference-free service by amending Section 73.182(k) of the Rules to return to predicting the nighttime interference-free coverage area by using only the interference contributions from co-channel stations and the 50% exclusion method.

Change Daytime Protection to Class B, C and D Stations

CTJC supports the Commission's proposals to: change the first adjacent channel D/U protection ratio from 2-to-1 (6 dB) to 1-to-1 (0 dB); change the second adjacent channel protection criterion to prohibit overlap of the desired and undesired station's 25 mV/m signal contours; and eliminate the third adjacent channel protection requirement. We also support the Commission's proposal to increase the daytime protected contour of Class B, C and D stations. However, we suggest an increase to the 1 mV/m protected contour rather than the proposed 2 mV/m protected contour.

The National Radio Systems Committee in its Summary Report, NRSC-R101, Dec. 2006, states that objective measurements have established that the majority of current analog AM receivers have audio bandwidths of less than 5 kHz. If fact, with only a few exceptions, the frequency response of individual receivers begins to fall off just above 1 or 2 kHz.[1] This fact supports the selection of a D/U ratio of 1-to-1 (0 dB) for first adjacent channel stations at the desired station's protected signal contour.

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[1] This was pointed out in the Comments of du Treil, Lundin and Rackley, Inc. in response to the Revitalization of the AM Radio Service, Notice of Proposed Rule Making, 28 FCC Rcd 15221 (2013) ("NPRM").

The Commission's proposals to change the second adjacent channel protection criterion and eliminate the third adjacent channel protection criterion are designed to allow station licensees greater flexibility to increase power or modify their directional patterns in order to overcome manmade noise and better serve their communities. In addition, these changes will allow greater flexibility in siting new stations and in relocating existing stations. In the absence of receiver performance data to the contrary, it is our opinion that the proposed changes will not cause material interference in the AM band.

The FNPRM proposes to change the daytime protected contour of Class B, C and D stations from the 0.5 mV/m contour to the 2 mV/m contour. This is an increase of 12 dB. There is no doubt that environmental noise has, over time, increased substantially, however, an increase of 12 dB is, in our opinion, extreme. This would be equivalent to a noise power increase of approximately 16 times. If such a change to the Rules were adopted, those stations in non-urban environments where the noise power is considerably lower could lose a substantial portion of their audience that reside outside of the 2 mV/m contour but within the area that is not currently noise limited. Further in rural areas there can be far fewer aural services available to listeners than in urban areas and therefore the importance of the loss of service beyond the 2 mV/m contour takes on significantly greater importance.

We believe that selection of a new daytime protected signal contour should strike a balance between overcoming noise in urban environments and maintaining coverage and listenership in non-urban environments where the noise power in the AM band is considerably lower. Therefore we support increasing the daytime protected contour to 1 mV/m corresponding to a 6 dB increase over the current 0.5 mV/m contour.

Once a change to the daytime protected contour is adopted, a station could, depending on its allocation situation, increase power to overcome manmade noise. However, most existing Class C stations are already operating at the maximum power for their Class and would have no way to take advantage of the new Rule change. In fact, these stations would likely receive additional interference from first adjacent channel Class B and D stations, taking advantage of the fact that the Class C station's protected contour had increased. This is another reason to adopt a less extreme change to the daytime protected contour than that proposed in the FNPRM. Class B and D stations that are currently operating with a daytime power of 50 kW would also not be able to increase power to overcome manmade noise and would likely receive additional interference from both co-channel and first adjacent channel stations should these other stations increase power under the new Rules as proposed.

For many Class B and D stations, an increase to the daytime protected contour would allow the opportunity to increase power in order to overcome manmade noise. The question of how many stations might take advantage of such a Rule change was evaluated by randomly selecting a sample of fifteen Class B and D stations and evaluating the potential for a power increase under the assumption of both a 1 mV/m and 2 mV/m protected contour. For this study we also assumed that the proposed changes to the Rules regarding adjacent channel protections were also adopted. To limit the magnitude of the study, we assumed that each station would use its existing daytime pattern and all other co-channel and adjacent channel stations would remain at their current licensed power level. Table 2 below tabulates each studied station's Class and current licensed facilities; the power level that would be possible under the assumption of both a 1 mV/m and 2 mV/m daytime protected contour; and the populations within those two protected contours.

Reference No.	Station Facilities	Power (kilowatts)	1 mV/m Population	Power (kilowatts)	2 mV/m Population
1	Class D 10 kW-D, ND	50	3,222,192	50	2,520,363
2	Class B 5 kW-D, 1 kW-N, DA-2	12	1,204,683	50	1,229,183
3	Class D 10 kW-D, 0.18 kW-N, DA-D	10	982,113	15	726,486
4	Class D 5 kW-D, 0.036 kW-N, ND	5	318,913	13	287,338
5	Class B 10 kW-D, 5 kW-N, DA-N	50	950,284	50	710,016
6	Class B 2 kW-D, 0.37 kW-N, DA-N	2	80,472	2	51,044
7	Class D 10 kW-D, 0.1 kW-N, DA-2	50	618,229	50	492,060
8	Class B 10 kW-D, 10 kW-N, DA-2	50	597,310	50	469,223
9	Class B 5 kW-D, 0.5 kW, DA-N	6.9	3,394,426	38	3,715,822
10	Class B 5 kW-D, 5 kW-N, DA-N	5	545,180	5	303,636
11	Class B 5 kW-D, 5 kW-N, DA-N	5	4,313,284	12	3,969,239
12	Class D 5 kW-D, 0.11 kW-N, DA-2	5	1,389,729	10	1,145,706
13	Class B 15 kW-D, 20 kW-N, DA-2	15	734,919	15	455,128
14	Class B 5 kW-D, 1 kW-N, DA-2	5	5,376,376	24	5,737,168
15	Class D 5 kW-D, 0.17 kW-N, DA-2	5	2,790,341	5	1,209,774

Table 2. Potential Power Increase for Fifteen Class B and Class D Stations

The study results indicate that from a power perspective, six of the fifteen stations studied could potentially increase power under the assumption of a 1 mV/m daytime protected contour while eleven stations could increase power under the assumption of a 2 mV/m protected contour. From a population perspective however, twelve of the fifteen stations would have a greater population within their protected contour under the assumption of a 1 mV/m protected contour when compared to the populations within the protected contour under the assumption of a 2 mV/m protected contour. This of course assumes that the reception within the 1 mV/m contour is not noise limited. Further, those stations that cannot increase power under either the 1 mV/m or 2 mV/m protected contour scenarios would receive far less interference from other co-channel and first adjacent channel stations under the 1 mV/m assumption and therefore benefit from a lower protected contour.

REVISE RULE ON SITING OF FM CROSS-SERVICE FILL-IN TRANSLATORS

CTJC peripherally addressed this subject in Reply Comments to the earlier NPRM and continues to support a modification to the Rules to allow a translator's 60 dBu contour to be wholly within the AM station's 2 mV/m daytime contour or within a specified radius of the AM station's transmitter site whichever is **greater.** Further evaluation leads us to agree with the Commission's current proposal to modify Section 74.1201(g) of the Rules to provide that the coverage contour (1 mV/m) of an FM translator station rebroadcasting an AM radio station as its primary station must be contained within the **greater** of either the 2 mV/m daytime contour of the AM station or a 25 mile (40 km) radius centered at the AM transmitter site, but that in no event may the translator's 1 mV/m coverage contour extend beyond a 40 mile (64km) radius centered at the AM transmitter site.

MODIFY PARTIAL PROOF-OF-PERFORMANCE RULES

CTJC supports the Commission's proposal to modify Section 74.154(a) of the Rules to require that partial proof of performance measurements be made only on radials which contain a monitor point. In most cases, radials that contain a monitor point correspond to the directions of the pattern minima. The field strengths along these radials are the most sensitive to parameter changes, or other changes that may occur at the antenna site that may affect the directional pattern and therefore represent the best indication of the condition of the directional pattern. We therefore conclude that measurements of the field strengths only along radials that contain a monitor point are sufficient to verify pattern compliance when performing a partial proof of performance.

MODIFY RULES FOR METHOD OF MOMENTS PROOFS

CTJC n supports the Commission's proposals in part to modify the Rules for Method of Moments proofs of performance. We agree with the Commission's proposal to retain the requirement for reference field strength measurements and also support elimination of the requirement to re-measure the reference field strengths during recertification of a station's directional pattern(s). We do not support the complete elimination of the sample system recertification measurement requirements for the reasons stated below, but rather would support a relaxation of the time interval between recertification measurements to 48 months instead of the current 24 month time interval.

This firm has performed sample system recertification measurements for eighteen stations after the initial 24 month interval, twelve stations after the second 24 month interval and 2 stations after the third 24 month interval. The performance of two out of eighteen sample systems tested was determined to be noncompliant after the initial 24 month interval, corresponding to approximately 11% of the systems tested.[2] The performance of one out of twelve systems tested was determined to be noncompliant after the second 24 month interval corresponding to approximately 8% of the systems tested during the second time interval.[3]

Therefore, based on this firm's experience in performing recertification measurement, roughly 10% of the systems have been found to be noncompliant after each 24 month time interval. Using this data to evaluate extending the time interval between recertification measurements, one would expect that 20% of the systems would be noncompliant assuming a 48 month (4 year) recertification interval[4], 30% of the systems would be noncompliant assuming a 72 month (6 year) interval, and 40% of the systems would be noncompliant assuming a 96 month (8

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[2] During the initial 24 month interval, the performance of one antenna monitor was determined to be noncompliant and the unit was returned to the manufacturer for calibration; and the performance of one toroidal current transformer was determined to be noncompliant and it was replaced.

[3] During the second 24 month interval, the performance of one antenna monitor was determined to be noncompliant and the unit was returned to the manufacturer for calibration.

[4] In the case of the 12 sample systems measured by this firm for both the initial and second 24 month period, 25% of the systems were determined to be noncompliant assuming a 48 month recertification interval.

year) interval. Based on this analysis and the fact that little data is available for the third 24 month recertification interval and no data exists for the fourth 24 month interval, we would support increasing the time interval between recertification measurements to no more than 48 months. We realize that the data sample is relatively small and we will be interested to see whether or not the experience of others supports the statistics presented here.

CTJC supports eliminating the requirement to remove base current and voltage sampling devices for performance testing during the recertification process provided that the requirement to measure the sample line impedance with the sampling device connected is maintained. Removal and reinstallation of the base sampling devices for testing, in most cases, is the most labor intensive portion of the sample system recertification process and, as pointed out in previous comments in this proceeding, repeated removal and replacement has some potential to cause damage to the sample line connector. Failure or out of tolerance performance of the sample device can in most cases be detected by the measurement of the impedance of the sample line with the sample device connected. We note that this is the same performance verification procedure that is currently used when tower mounted loop sampling devices are employed.

CTJC supports the proposal to expand the application of the exemption from the requirement to submit a surveyor's certification to include those stations that propose modifying their directional pattern(s) provided that the tower geometry remains unchanged and there are no new towers added to the array. The Commission's present policy with regard to the submission of a surveyor's certification is to exempt licensed stations applying to re-license under the MoM procedures in the Rules from the requirement to submit a certification, provided that there is no change to the authorized theoretical pattern or patterns. In adopting the present policy, the Commission understood that a certain small subset of stations that would re-license under the MoM Rules would have tower arrays that did not comply with the 1.5 electrical degree tower location tolerance as a result of errors in the original survey at the time the towers were constructed.

Since the time that the MoM Rules were adopted in 2009, nearly 250 stations have been licensed under these Rules with the vast majority of those stations being exempt from submitting a surveyor's certification. To our knowledge there has been no complaint of additional interference resulting from the relicensing of these exempt stations. In light of the lack of observed interference to date from the large number of stations that have relicensed under the MoM Rules, it seems reasonable, with a low risk of creating any material harmful interference, to expand the application of the surveyor's certification exemption to include stations that propose to modify their patterns with the provision that the array geometry remain the same and that there be no new towers added to the array.

CTJC supports the proposal to clarify Section 73.151(c)(1)(viii) of the Rules to specify that the present requirement in the Rules that limits the total capacitive reactance to no less than five times the magnitude of the tower base operating impedance only applies to cases where the total base capacitance is greater than 250 pF. Further, this limitation should only apply to systems that employ base current sampling.

We have reservations with regard to permitting the use of MoM modeling when skirt-fed towers are used in directional antenna systems. We have had only limited success in accurately modeling directional antenna systems comprised of skirt-fed towers and this is likely attributable to limitations of the MoM model's ability to handle antenna structures that have wires of vastly different radii connected to, or in close proximity of, each other. We are not absolutely opposed to the proposed Rule change but believe that an expanded set of procedures and limitations would have to be developed and applied when modeling these types of antennas.

With regard to minor modifications to a tower in a directional antenna system that has been licensed under the Method of Moments procedures in the Rules, CTJC supports the proposal to limit the requirement for re-proofing to only those cases where the measured base impedance of the affected tower has changed to the degree that it is outside of the allowable tolerance with respect to the modeled impedance as specified in the license application.

CTJC supports the proposal to eliminate the requirement for current distribution measurements to be performed for top-loaded or other unusual antenna configurations when MoM or other numerical analysis methods are used to determine the antenna's characteristics. This firm's experience is that current distribution measurements are unreliable and are difficult to analyze due to the influence in the measurement from fields generated from current flowing in nearby structural guy wires and the even greater influence from fields generated from current flowing in the top loading guy wires for measurements performed near the top of the tower. Further, Method of Moments analysis of the current distribution prior to construction of the tower provides an accurate means to determine the required physical length of the top loading wires eliminating the requirement to modify the length after the tower has been erected.

REQUIRE SURRENDER OF LICENSES BY DUAL EXPANDED BAND/STANDARD BAND LICENSEES

CTJC proposes that under some limited circumstances it would be reasonable and equitable for dual band licensees to be permitted to retain both standard band and expanded band authorizations. In some instances the two stations are operated in a simulcast mode which contributes little value to serving the public interest. Such licensees should be required to select one of the stations and return that license for cancellation.

However, there are some licensees who have developed their stations into two distinct entities which individually provide separate program streams, and therefore two options for the benefit of the listening public. In such a scenario, if the licensee can meet the ownership limits for the subject market with both stations deemed attributable then the licensee should be able to retain both stations, provided that the license of neither station could be separately assigned for a period of three years.

A dual band licensee that has invested in developing separate station operations, and two individual program services, deserves some consideration to avoid stranding his investment by not being forced to divest with no opportunity for recovery.

Respectfully Submitted, March 21, 2016

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Before the
Federal Communications Commission
Washington, D.C.

In the matter of:

	)	
Revitalization of the AM Radio Service	)	**MB Docket No. 13-249**
	)	

REPLY COMMENTS OF CARL T. JONES CORPORATION

Carl T. Jones Corporation, an engineering consulting firm, hereby submits reply comments responding to the Commission's October 23, 2015 Further Notice of Proposed Rule Making ("FNPRM") in the above-captioned proceeding. Carl T. Jones Corporation ("CTJC") provides technical assistance to AM broadcasters, supporting development of new and improved transmission facilities. The Corporation has been engaged in these endeavors continuously since 1935.

The instant FNPRM is the second part of a major revision to the technical standards intended to revitalize the use of the AM broadcast band to serve the needs of the listening public. The first part of this revitalization effort has been achieved by several changes in the Rules set forth in the First Report and Order issued in this proceeding. We have reviewed the comments that have been filed in response to the Commission's FNPRM and offer reply comments addressed to many of the comments of others regarding technical proposals therein advanced.

Critical Hours Protection to Class A AM Stations

In the FNPRM, the Commission proposes to eliminate the existing critical hours protection afforded to Class A stations. We note that several commenters[1] support the Commission's proposal, we believe that the predicted results do not support eliminating this protection. The ionospheric reflections during full daytime conditions typically miss the Earth's surface. Thus the predicted interference conditions between stations can be reliably based on groundwave signals. However, during the hours immediately adjacent to sunrise and sunset there exists ionospheric conditions that support reflections of signals in the AM band which do impinge on the Earth's surface thereby creating interference to the groundwave service areas of other stations. Many AM radio stations are currently required to reduce their daytime power during these critical hours to afford interference protection to Class A stations.

We have developed an example of critical hours interference conditions which reveal some detrimental effects that are predicted should the Commission's proposal to eliminate critical hours protection be adopted. KMOX is a Class A station that operates on 1120 kHz, and is licensed to St. Louis, Missouri. KMOX is provided protection during critical hours by four co-channel daytime only stations, located in North Carolina, Mississippi, Oklahoma and the District of Columbia. The power reductions required during critical hours for these four stations to protect KMOX range from 1.55 dB to 6.02 dB to 12.22 dB.

The most severe required power reduction is for WUST, 1120 kHz, Washington, DC. Its authorized daytime power is 50 kW, while the authorized power during critical hours is 3 kW. We have calculated the predicted effect on the protected groundwave service area of KMOX should critical hours protection be discontinued, thereby permitting WUST to operate at 50 kW during critical hours. Figure 1 displays KMOX's predicted 0.1 mV/m protected groundwave service contour, and WUST's predicted 50 kW daytime skywave interfering contour. Figure 1A shows an expanded view of KMOX's protected

[1] Edward Paul DeLaHunt, Bemidji Radio, Inc. Comments at 6; R. Morgan Burrow, Jr., P.E. Comments at 4; Communications Technologies, Inc. Comments at 2.

service area and the area of potential interference that would result if the critical hours protection requirement were to be eliminated. The interference area shown contains 3,157,170 persons.

Change Nighttime Protection to Class A AM Stations

We have evaluated comments, both pro and con, and note that some commenters propose maintaining the nighttime status quo while others substantially agree with the Commission's proposal to change the protected nighttime contour for Class A stations from the 0.5 mV/m - 50% skywave contour to the 0.1 mV/m groundwave contour, and change the nighttime co-channel interfering contour from the 0.025 mV/m - 10% skywave contour to the 0.005 mV/m groundwave contour.

In our comments we provided studies that evaluated the nighttime skywave interference that could result to four Class A station's groundwave service area if the proposed nighttime groundwave interfering contour were to be the only nighttime interference protection provided. We concluded, and we note that many other commenters agree, that some type of protection to Class A stations from skywave interference is considered necessary, rather than depend on the avoidance of groundwave to groundwave contour overlap.

Some commenters[2] have suggested that nighttime interference to Class A stations should be based on the RSS 50% exclusion method, such that any change in another station would not cause an increase in a site-to-site night limit. We support a different methodology: simply prohibit the overlap of any potential interfering station's predicted 10% skywave contour with the protected groundwave contour of the Class A station on a 20 to 1 desired to undesired ratio. We contend this method would be simpler to implement

[2] duTreil, Lundin & Rackley, Inc. Comments at 4-7; Hatfield & Dawson Consulting Engineers, LLC Comments at 1-2.

and would provide a more consistent level of interference protection.

We agree with some commenters that, as a practical matter, overall skywave interference levels preclude the satisfactory reception of nighttime AM signals below about 0.5 mV/m. We therefore support a 0.5 mV/m protected nighttime groundwave contour for Class A stations instead of the proposed 0.1 mV/m nighttime contour. We propose that the Class A protection criterion specify that there can be no overlap of the Class A station's nighttime 0.5 mV/m protected groundwave contour from a potential interfering station's 0.025 mV/m 10% skywave contour. We believe, and some commenters agree, that this protection criterion will serve to limit new nighttime interference to the Class A station's present groundwave service area while at the same time providing some relief to other stations operating on the Class A channel that desire a new nighttime service, in the case of daytime only Class D stations, or an improvement to their existing nighttime service in the case of Class B stations and for those Class D stations that already have secondary nighttime service.

Change Daytime Protection to Class B, C and D Stations

We note almost universal support among commenters, including ourselves, for the Commission's proposal to: change the first adjacent channel D/U protection ratio from 2 to 1 (6 dB) to 1 to 1 (0 dB); change the second adjacent channel protection criterion to prohibit overlap of the desired and undesired station's 25 mV/m signal contours; and eliminate the third adjacent channel protection requirement.

We observe, however, that among the commenters there seems to be no consensus as to the FNPRM's proposal to alter the protected daytime groundwave contour from 0.5 mV/m to 2.0 mV/m. A few commenters[3] contend that there should be no change to the

[3] AM Radio Preservation Alliance Comments at 33-39; R. Morgan Burrow, Jr., P.E. Comments at 2.

current 0.5 mV/m protected contour. Others support the proposed change to 2.0 mV/m. Still other commenters[4] believe that some increase in the protected contour is warranted. We also support the Commission's proposal to increase the daytime protected contour of Class B, C, and D stations but, for reasons previously stated in our comments, we support an increase only to the 1 mV/m contour rather than the proposed 2 mV/m contour.

We believe, as some other commenters[5] do, that selection of a new daytime protected signal contour should strike a balance between overcoming noise in urban environments and maintaining coverage and listenership in non-urban environments where the noise power in the AM band is considerably lower. Therefore we support increasing the daytime protected contour to 1 mV/m corresponding to a 6 dB increase over the current 0.5 mV/m contour.

The exception of course is the protected daytime groundwave service contour of Class A stations. The FNPRM proposed to maintain the present 0.1 mV/m. We agree, though some commenters[6] propose increasing this to 0.5 mV/m. While we did propose increasing the nighttime groundwave protected contour for Class A stations to 0.5 mV/m, that increase is based on the existing level of nighttime skywave interference. Daytime interference is much less and we believe the current standard should be maintained.

Conclusion

We are very encouraged by the widespread interest that is demonstrated by the plethora of comments that have been offered in this proceeding intended to discover ways and means to assist in the revitalization of the radio service in the AM band. The Commission's proposals set forth in the FNPRM elicited many sincere and thoughtful

[4] TZ Sawyer Technical Consultants, LLC Comments at 3; Edward A. Schrober, P.E. Comments at 3-4.
[5] National Association of Broadcasters Comments at 4-6.
[6] AM Broadcast Licensees Commenter at 2; Charles M. Anderson Comments at 1; Communication Technologies, Inc. Comments at 2; Crawford Broadcasting Company Comments at 1-2.

suggestions, both in favor and opposed to those proposals, and some of those commenters have provided engineering studies, both pro and con, that might serve to provide a framework that can be used to develop fair and equitable revisions to provide most, if not all, AM stations an avenue to achieve some modicum of improvement, while minimizing potential detriment.

Respectfully Submitted, April 18, 2016

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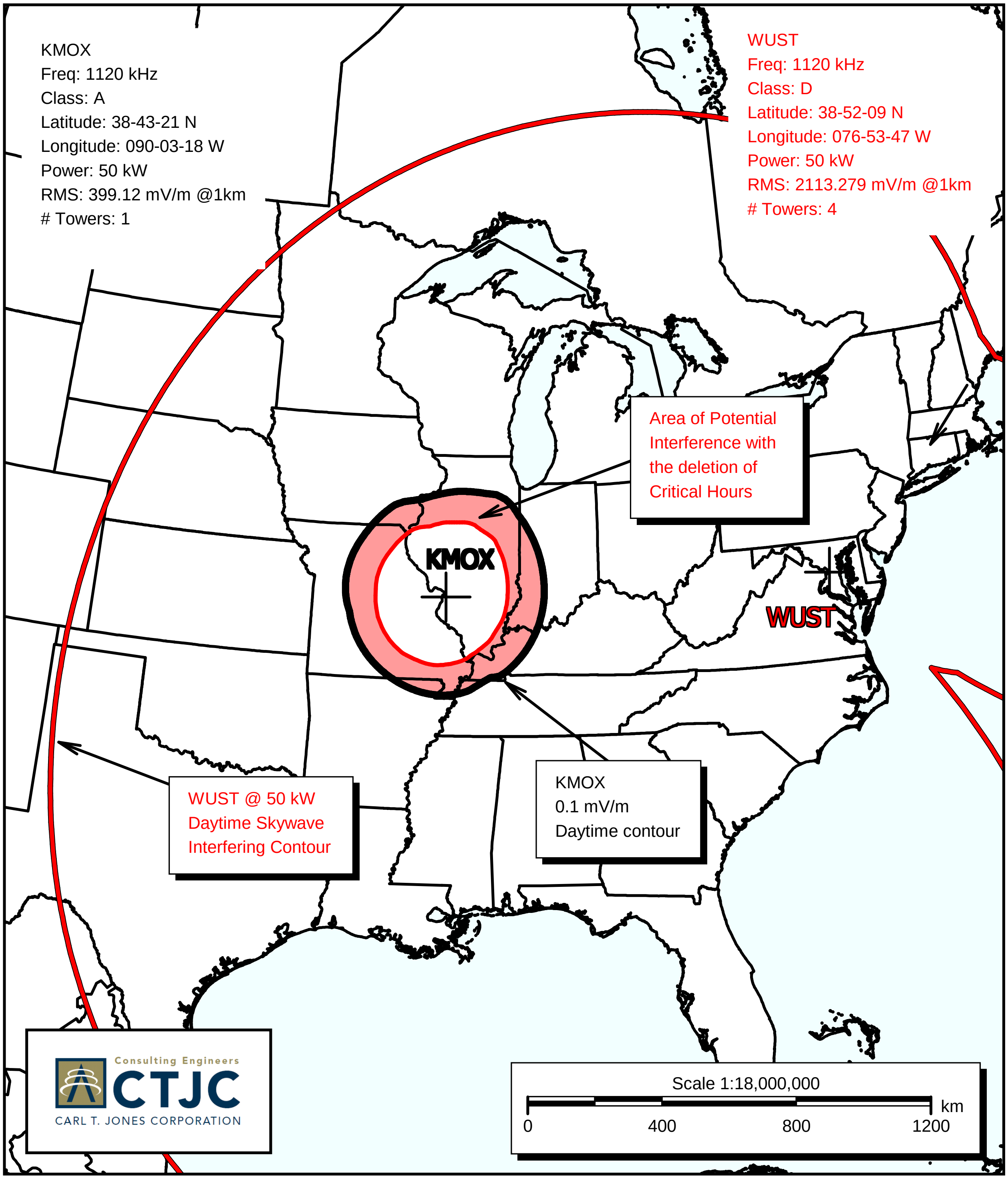
FIGURE 1

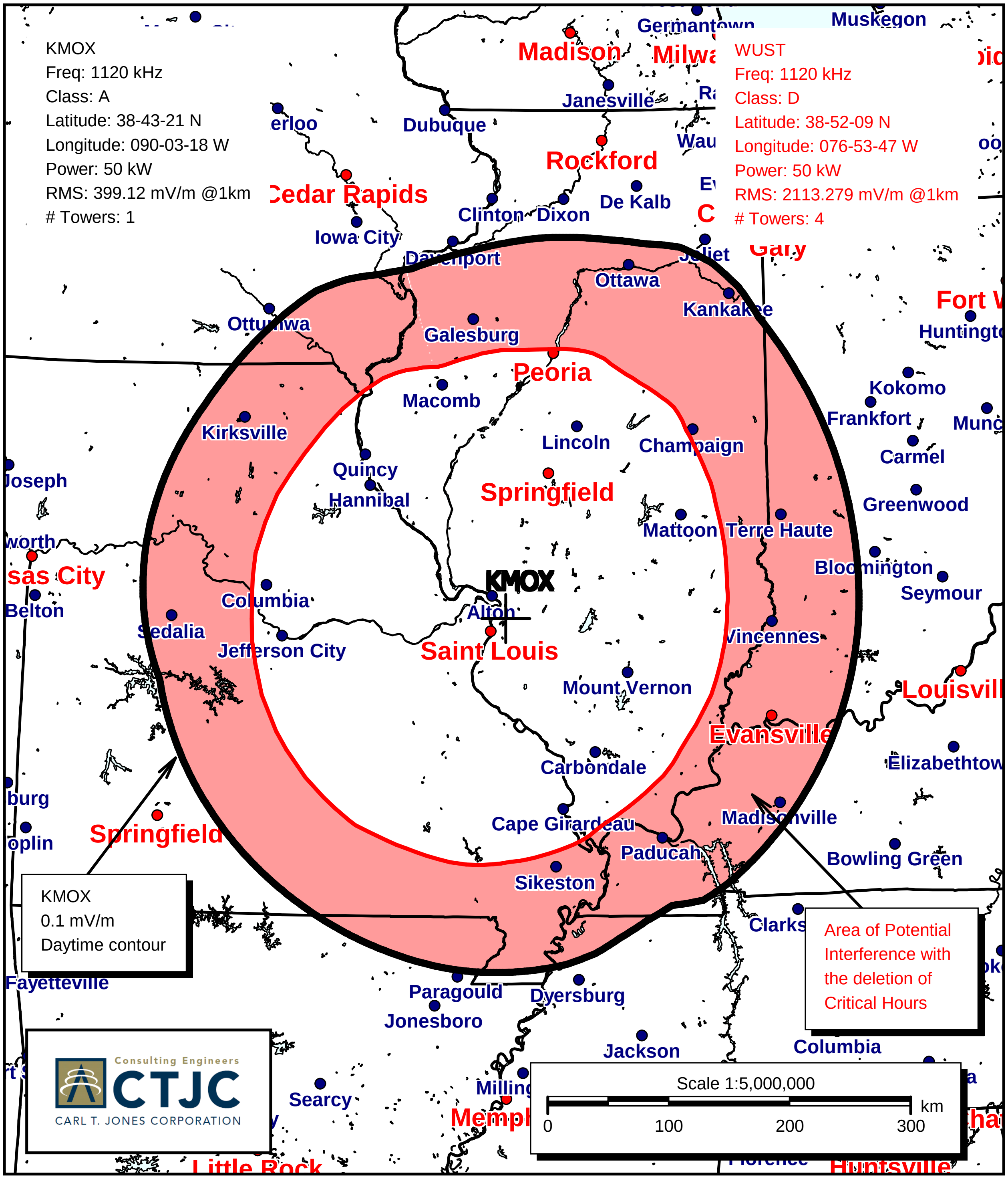


INTERFERENCE AREA TO
KMOX - ST. LOUIX, MISSOURI
DURING CRITICAL HOURS
APRIL, 2016

POPULATIONS
0.1 mV/m daytime: 8,564,836 persons

Interference area with WUST @ 50.0 kW: 3,157,170 persons

FIGURE 1A



INTERFERENCE AREA TO KMOX - ST. LOUIX, MISSOURI DURING CRITICAL HOURS (EXPANDED)
APRIL, 2016

POPULATIONS
0.1 mV/m daytime: 8,564,836 persons

Interference area with WUST @ 50.0 kW: 3,157,170 persons